數種殺蟲劑對甘藍蚜蟲和小菜蛾防治試驗

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摘要： 供試數種殺蟲劑中，以Padan 50% SP 1250倍及 Salithion 25% EC 500倍，對蚜蟲類和小菜蛾之防除，均有優異效果，較標準殺蟲劑大利農（Diazinon）雖略差些，但差異並不顯著。

Gardona 24% EC 500倍，對小菜蛾防除效果雖佳，但對蚜蟲類，尤以菜蚜 *Brevicoryne brassicae* 却完全無效。在其試用期間，蚜蟲之爲害率，自始至終與對照區者甚相近似。

Lannate 90% WP 之 1500倍液，對蚜蟲類和小菜蛾，雖亦有優異防除效果，但因對包心白菜和甘藍均相繼發生藥害。其藥害程度，因濃度高低，施藥次數及施藥量多寡而有嚴重和輕微之差，並隨蔬菜種類不同而異，一般包心白菜較甘藍容易發生藥害。

數種除蟲效果較優殺蟲劑，對蔬菜產量亦有提高效果。除 Lannate 和 Gardona 外，Salthion, Diazinon, Dibrom 和 Padan 等四種殺蟲劑處理區與對照區相比，均增產甚多。

一、前　言

民國五十七年，臺灣省植物保護審議會審查通過接受麒麟、武田、合裕、瑞豊等公司之委託，以(1) Gardona; EC; 24% 2-chloro-1-(2, 4, 5-trichlorophenyl) vinyl dimethyl phosphate. (2) Padan; SP; 50% 1,3-Bis(carbamoylthio)-2-(N,Ndimethyl amino)Propane hydrochlororide. (3) Lannate; wp; 90% S-Methyl N-(Methyl carbamoyl) oxy thioacetinidate. (4) Salithion; EC; 25% 2-Methoxy-4H-1,3,2-benZodioxy phos-pholine-2-Sulfite. 等四種新出品殺蟲劑，作小菜蛾（*Plutella maculipennis* Curtis）和蚜蟲類如僞菜蚜（*Lipaphis erysimi* Kaltenbach），菜蚜（*Brevicoryne brassicae* Linne），桃蚜（*Myzus persicae* Sulzer）等的防治試驗。經本分所於五十七年十二月舉行田間試驗，並於十二月十七日舉行觀摩會。但因當時小菜蛾發生甚少，致供試之數種殺蟲劑對該蟲之防治效果，無從比較其優劣。復奉　農林廳植物保護科命令於五十八年一月再行試驗。

本委託試驗係由台中區農業改良場及鳳山熱帶園藝試驗分所負責辦理。茲將本分所試驗結果，整理發表，以供參攷。文成後蒙孫主任守恭賜予斧正，並蒙郁分所長宗雄，黃主任讚准予發表，謹誌謝忱。

二、材料及方法

(一) 供試殺蟲劑及稀釋倍數：供試殺蟲劑，除上述四種外，另加 Dibrom 和 Diazinon 等兩種對照殺蟲劑。其稀釋倍數爲 Padan 50% SP 1250倍。Gardona 24% EC 500倍。Lannate 90% WP 1500倍，3000倍。 Salithion 25% EC 500倍， 1000倍。 Dibrom 64.5% EC 1000倍。Diazinon 60% EC 1500倍。

(二) 供試驗蔬菜：晚生種甘藍，於58年1月28日定植。

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㈢ 田間設計：小區面積為 2.4m×4m＝9.6 m^2。每小區種甘藍4行，每行10株。6種殺蟲劑計有8種稀釋倍數，並加不施藥對照區，計有9處理，4重複，合計36小區。為逢機完全區集設計(Randomized complete block design)。

㈣ 施藥日期：於58年1月16日起，每隔10天噴藥一次，計噴5次。

㈤ 調查方法：每小區種甘藍4行，鑒於靠外邊兩行因受鄰區不同藥液飄拂之影響，取樣時乃取中間兩行，每行調查5株，即左邊取第 2, 4, 6, 8, 10 株，右邊取第 1, 3, 5, 7, 9 株，每小區調查10株，4重複共調查40株。

蚜蟲因其蟲數衆多，計算費時，而僞菜蚜往往於被驚擾時，有紛紛墮地之習性，故計算蟲數誤差很大。因此調查時，乃以無翅雌成蟲及其所生幼體之爲害葉數，與全株總葉數相比，作成爲害百分率。變量分析時將百分率換算爲轉角函數計算之。

小菜蛾則計算每株之幼蟲數。爲求每株調查葉數一致，故在第一次調查時植株尙小，每株調查5葉，以後各次，每株均各調查10葉。因小菜蛾幼蟲嗜食嫩葉，取樣均從心部已展開之葉算起。

調查時間，都在施藥前一天施行調查，計調查四次。

三、結果及討論

此次試驗，小菜蛾發生，較十至十二月間者爲多。在第一次至第三次調查時，對照區每株平均蟲數爲 6.38～8.00 隻在第四次調查時，其平均蟲數驟增至21.33隻。蚜蟲類發生亦甚多，但其爲害率高低，隨氣溫昇降而異。於第一次調查期間，最低及最高氣溫，平均爲 16.44°C～28.29°C，在對照區之爲害率高達 59.50％，即在各藥劑處理區之爲害率，尙有達24％以上者。於一月卅日有寒流來襲，氣溫驟降，並降小雨，因此在第二次調查期間，最低及最高氣溫平均爲 11.4°C～21.05°C，各處理區蚜蟲之爲害率均普遍降低，對照區降至 29.25％，除 Gardona 處理區外，其他各藥劑處理區，亦降至 0～1.5％。在第三、四次調查期間，最低及最高氣溫略有回昇，平均分別爲 13.28°C～26.94°C 及 14.16°C～26.50°C，故在對照區蚜蟲之爲害率亦隨之增至 35.00％ 及 84.00％，同時在其他各處理區之爲害率亦略增高。增高的幅度，以藥效優者較小，藥效差者則較大。

據各次調查，在 Gardona 處理區蚜蟲之爲害率與對照區者甚相接近。雖其差距，隨施藥次數之增加而增大，但在最後一次調查，蚜蟲爲害率仍高達 48.25％。所以該種殺蟲劑對蚜蟲類之防除效力甚微。

爲害甘藍蚜蟲類，計有僞菜蚜 ***Lipaphis erysimi*** Kaltenbach, 菜蚜 ***Brevicoryne brassicae*** Linne 及桃蚜 ***Myzus persicae*** Sulzer 等三種。在臺灣南部爲害甘藍之蚜蟲，向以僞菜蚜和桃蚜兩種較多，至於菜蚜，多發生在高冷地帶，南部甚少出現。但此次試驗時，菜蚜却發生甚多。

供試四種殺蟲劑，除 Gardona 24％ EC 之500倍，對蚜蟲類無效外，其餘三種殺蟲劑，以所試之稀倍數，對蚜蟲類防除均有優異效果，和兩種標準藥劑比較，差異都不顯著。詳如表一。

數種殺蟲劑，對小菜蛾均有優異防除效果，且彼此間差異不顯著。較標準殺蟲劑大利農 (Diazinon) 雖差，但差異並不顯著。較另一標準殺蟲劑大勃隆 (Dibrom) 效果均優，且差異顯著。詳如表二。

試驗時除觀察供試各新殺蟲劑對蚜蟲類和小菜蛾之防除效果外，同時並觀察其有無藥害。數種新殺蟲劑中，僅 Lannate 90％ WP 之 1500 和 3000 倍液在包心白菜和甘藍上，相繼發生藥害外，餘者均無藥害發生。

以所用施藥量，在包心白菜上噴射三次以後，在甘藍上噴射四次以後，便有藥害發生。發生藥害

表1 數種殺蟲劑對蚜蟲類防除效果

Table 1. Effectiveness of the insecticides for control of aphids *Lipaphis erysimi*, *Brevicoryne brassicae* and *Myzus persicae* on cabbages

殺蟲劑 Insecticide	有效成份 Active ingredient %	蚜蟲為害百分率* % of aphid-infested leaves at indicated date				
		1/27	2/7	2/14	2/24	平均 Average
Padan 50% SP	0.04	25.50	1.00	0	2.75	7.31
Gardona 24% EC	0.048	58.50	28.25	39.00	48.25	43.50
Lannate 90% WP	0.06	23.50	0	0	1.50	6.25
〃	0.03	31.00	0.50	0	7.00	9.63
Dibrom 64.5% EC	0.0645	31.00	1.50	0.50	8.25	10.31
Salithion 25% EC	0.05	36.50	0	0	1.50	9.50
〃	0.025	41.00	0	0	5.50	11.63
Diazinon 60% EC	0.04	24.00	0	0	1.00	6.25
CK (untreated)		59.50	29.25	35.00	84.00	51.94
					LSD	5%=4.29 1%=7.79

* Percentages were translated into angles for calculation

表2 各殺蟲劑對小菜蛾防除效果

Table 2. Effectiveness of the insecticides for control of diamondback moth *Plutella maculipennis* on cabbages

殺蟲劑 Insecticide	有效成份 Active ingredient %	平均每株小菜蛾幼蟲數 Average number of larvae per plant at indicated date				
		1/27	2/7	2/14	2/24	平均 Average
Padan 50% SP	0.04	1.85	0.60	0.15	2.53	1.28
Gardona 24% EC	0.048	1.60	0.67	0.50	3.90	1.67
Lannate 90% WP	0.06	1.73	1.13	0.30	2.78	1.49
〃	0.03	3.23	1.70	1.33	8.38	3.69
Dibrom 64.5% EC	0.0645	3.43	3.23	1.40	16.13	6.05
Salithion 25% EC	0.05	2.73	0.70	0.15	1.33	1.23
〃	0.025	1.75	0.68	0.13	4.78	1.84
Diazinon 60% EC	0.04	1.33	0.28	0.13	0.33	0.52
CK (untreated)		7.03	8.00	6.38	21.33	10.69
					LSD	5%=1.98 1%=2.69

象徵爲葉片黃化，發育遲滯葉緣稍呈萎縮。在甘藍上其徵象甚爲顯著，但在包心白菜上，因其和露菌病之病徵頗相類似，易於忽略，但若觀察葉背，兩者便有明顯區別。患露菌病者，其葉背有病原菌的灰白色分生胞子及分生胞子梗，遭受藥害者，其表面不但沒有灰白色黴狀物，且甚光亮，此爲兩者不同之處。

藥害的程度，因殺蟲劑濃度高低和施藥量多寡而異，施用濃度越高（低倍數）和施用量越多，則其藥害越嚴重。

試驗結束後，於採收時每處理施行將調查之兩行甘藍，分別記載其重量。58年４月１日及10日作兩次採收，採收時將外葉剝除，視結球大小及完整程度，分有商品價值及無商品價值，分別秤其重量，詳如表三。

表３　各處理之甘藍產量比較

Table 3. Yields of cabbages among treatments

殺蟲劑 Insecticide	有效成份 Active ingredient (%)	小區平均產量（公斤） Average weight of cabbages per plot (kg)					
		有商品價值 Salable		增產率 Increase over check		無商品價值 un-salable	
		個數 Head	重量 weight	個數 Head	重量 weight	個數 Head	重量 weight
Padan 50% SP	0.040	17.75	26.200	7,000	9,427	2.25	1.60
Gardona 24% EC	0.048	14.75	23.293	5,800	8,370	4.50	2.618
Lannate 90% WP	0.060	3.00	3.675	1,200	1,236	17.00	6.778
〃	0.030	11.25	14.238	4,400	5,077	8.50	4.525
Dibrom 64.5% EC	0.0645	18.25	30.213	7,200	10,887	1.75	1.163
Salithion 25% EC	0.050	19.50	38.450	7,700	13,882	0.50	3.875
〃	0.025	17.25	30.475	6,800	10,982	2.75	1.925
Diazinon 60% EC	0.040	18.75	33.920	7,400	12,234	1.25	0.675
CK (untrected)		0.25	0.275	—	—	19.75	6.121

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EVALUATION OF SEVERAL INSECTICIDES FOR CONTROL OF APHIDS AND DIAMONDBACK MOTH ON CABBAGES

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Summary

Padan 50% SP, Gardona 24% EC, Lannate 90% EC and Salithion 25% EC were tested against the insect pests, *Lipaphis erysimi*, *Brevicoryne brassicae*, *Myzus persicae*, and *Plutella maculipennis*, on cabbages. Two standard insecticides, Dibrom 64.5% EC and Diazinon 60% EC, and untreated check plots were used in each replication for comparison with the new test insecticides., The criterion of evaluation is based on the reduction of insect population, phytotoxicity, and crop yields.

All of the insecticides were applied five times starting from the time about eight days after planting at ten days intervals. Insect popnlations were estimated nine days after each application.. Aphid infestations were made on percentage of leaves infested with the three kinds of aphids mentioned above. Diamondback moth damage was determined by counting the larvae present on five leaves of each examined plant after the first application, while ten leaves were examined after the second application and other following applications.

Padan 0.04% and Salithion 0.05% were highly effective against these three kinds of aphids as well as diamondback moth. Gardona 0.048% was excellent against diamondback moth but failed in controlling aphids. The percentage of aphid infestations on Gardona treatment was similar to that of untreated cheek.

Lannate 0.06% gave effective control for both aphids and diamondback moth, but serious phytotoxicity appeared on cabbages after three or four applications were made. More serious phytotoxicity caused by Lannate was also observed on chinese cabbages in another trial. The symptom of phytotoxicity caused by Lannate on chinese cabbage is very similar to the symptom caused by downy mildew (*Peronospera brassicae* Gaum). But it can be distinguished by examining the undersurface of leaves. If it is caused by Lannate, the undersurface of leaves is smooth and shining, while it is caused by downy mildew is covered by lots of conidia and conidiophores.

As the check insecticides, Diazinon 0.04% showed better result against both aphid and diamondback moth than Dibrom 0.0645%,

Yields of cabbages were significantly increased both in quantity and quality in

the treated block which showed excellent results of insect control.

There is something worth to be mentioned that aphid populations were greatly affected by weather conditions. As showed in table 1, the populations of aphids dropped down sharply during the second aud third examinations. It was due mainly to the fact of a cold stream came with light rainfall in the early of February for several days in southern Taiwan. The average minimum temperature dropped to 11.4°C during that time, when the cold stream passed away and the average minimum temperature raised to 14°C and higher, the population of aphids increased greatly again in the fourth examination.